History of Computer Developments in Romania

ANONYMOUS

This anonymous contribution covers computer developments in Romania from its beginnings in the 1950s building first-generation computers up to the 1990s, when Romania started to develop a market economy and connected to the Internet.

Introduction: The Early Years

In the 1950s, Romania was heavily influenced by Soviet political dominance. *The Philosophical Dictionary* translated from Russian and published in 1953 described cybernetics as a "reactionary bourgeois science directed against the working class." However, a few Romanian scientists promoted cybernetics. Professor Grigore C. Moisil,[1] a member of the Romanian Academy, was the main promoter of the new science in academic, university, and high school circles.

In the period 1952–1960, Professor Moisil in Bucharest developed an internationally recognized Romanian school of the theory of polyvalent logic. Professor Tiberiu Popoviciu[2] in Cluj-Napoca created a school of mathematical computation and promoted automatic calculus.

With Moisil's encouragement, research began in 1954 at the Institute of Atomic Physics of the Romanian Academy to create the first Romanian computer. As a result, in 1957, CIFA-1—the first computer in Romania and most probably the first in Eastern Europe—was put in operation by a team led by Victor Toma,[3] a scientist at the institute. (CIFA is an abbreviation of the Romanian words for "the computer of the Institute of Atomic Physics.") CIFA-1 was a first-generation computer with the following:

- electronic tubes,
- magnetic drum memory,
- punched paper tape input, and
- typewriter output.

Programming was performed in machine code. Toma continued his activity by designing and building CIFA-2, CIFA-3 (1960–1964), and the transistorized version CET after 1964.

At the same time, another team started research to build a computer. In 1961, MECIPT-1, the first Romanian computer built in a university laboratory, was completed. Wilhelm Loevenfeld[4] and Iosif Kaufmann[5] at the Polytechnical Institute (University) of Timisoara led the team. Vasile Baltac[6] had joined the team in 1960. He was involved in the design of the drum memory controller and memory access optimization by interleaving addresses. MECIPT-1 was also a first-generation computer with some more-advanced features (e.g., microprogramming). The microprogramming feature was not implemented accidentally. The scientist in charge of MECIPT wrote to Professor Maurice V. Wilkes at the Mathematical Laboratory in Cambridge, England, and got reprints of his famous articles on microprogramming. Baltac also spent the academic year 1966–1967 at Cambridge working under his supervision. The team further designed and built MECIPT-2 in 1963 (the first to be used purposely for CAD applications) and a second-generation computer (MECIPT-3) that was completed in 1965.

After 1961, other teams developed first- and second-generation computers. In Cluj-Napoca at the Institute of Computation, a first-generation computer (DACICC-1) was completed in 1963, followed by DACICC-2 in 1965. Popoviciu,[7] Emil Muntean,[8] Teodor Rus,[9] Mircea Bocu,[10] and Gheorghe Farkas[11] made contributions at the Institute of Computation.

At the same time, in Bucharest at the Institute of Atomic Physics, a team led by Armand Segal[12] successfully built a family of first- and second-generation computers:

- CIFA-101 (in 1963),
- CIFA-102, and
- CET-500.

At the Institute for Automation, a computer research and development team started the first industrial applications. Samuel Schachter,[13] Lucia Popescu,[14] Francisc Momeo,[15] Lucian Nica,[16] and Lazar Sandu[17] made contributions.

Many people in scientific and engineering circles in Romania were enthusiastic about pioneering computer applications between 1957 and 1967. Most were being encouraged by the computer pioneers based at the newly created computer centers (e.g., CIFA, MECIPT, and DACICC). For example, a big hydroelectric dam on the river Arges was designed in 1962–1963 with calculations done by MECIPT-1 (at 70 operations per second, with all programming done in machine code). Ioan Zamfirescu and Dragos Vaida performed the first applications of computers in the Institute of Atomic Physics.

Beginning of Computer Science University Education

In 1955, a Romanian school of electronic devices was started. It was first initiated by Professor Tudor Tanasescu[18] and was further developed by Professor Mihai Draganescu[19] at the Faculty of

1058-6180/99/$10.00 © 1999 IEEE

Electronics of the Polytechnical University of Bucharest. The school soon turned to study the emerging computer field.

The creation of the first Romanian computers quickly brought the new science into the curricula of several universities. In 1966, the first generation of computer engineers graduated from the Polytechnical University of Timisoara. Professor Alexandru Rogojan[20] was the initiator of this new university diploma. Lectures on computers were first given by Rogojan, Baltac, Crisan Strugaru,[21] Aurel Soceneantu,[22] and Vasile Pop.[23]

The first graduates in computer science or engineering were in 1967–1968 from universities in Bucharest (the Polytechnical University, Bucharest University's Faculty of Mathematics, and the Academy of Economic Sciences) and in Cluj-Napoca (the University of Cluj-Napoca). Among the first professors were:

- Edmond Nicolau,[24]
- Corneiu Penescu,[25]
- Paul Constantinescu,[26]
- Mircea Petrescu,[27]
- Adrian Petrescu,[28]
- Vlad Ionescu,[29]
- Petre Dimo,[30]
- Ion Dumitrache,[31] and
- Marius Guran.[32]

During 1964–1967, several Romanian scientists were sent abroad for research work in famous universities:

- Constantinescu (in the academic year 1964/1965) at the University of London,
- Baltac (in 1966/1967) at the Mathematical Laboratory of the University of Cambridge, and
- Mircea Petrescu (in 1967/1968) at the University of California at Berkeley.

Computer Industry

In 1967, the government of Romania decided to promote the industrial development of computers. The centralized approach, typical for the communist political system, was adopted. A Governmental Committee for Computers and Data Processing was set up. The first permanent secretary was Draganescu.

In 1968, the Institute of Computer Technology (ITC, from the Romanian abbreviation of Institutul pentru Tehnica de Calcul) was formed by gathering researchers from all the computer pioneer teams of Bucharest, Timisoara, and Cluj-Napoca. The result was a big organization with about 250 staff. The general directors of the institute were Florin Muntean,[33] Dinu Buznea,[34] Baltac, and Victor Meghesan.[35] ITC played a major role in the development of computers in Romania and in the organizations of Eastern European countries (RYAD and minicomputer series). In 1969, the first software research and development department was created in ITC, and the first attempt to built a software industry was started. In the years between 1968 and 1989, ITC developed Romanian mainframes and minicomputers, including operating systems and compilers. Application software was also developed in various fields, such as the following:

- CAD/CAM systems in the electronic and the mechanical industries;
- accounting and financial software;
- industrial applications in chemical, textile, and cement factories;
- satellite data processing; and
- software packages for medical assistance.

In 1969, the industrial production of computers started based on licenses bought from France, Holland, and the United States. The Iris 50 computer was licensed from France—becoming the Felix 256. Between 1971 and 1975, the system was developed into the Felix C-512 and the Felix C-1024, with its own operating system (Helios). Computer companies were also started. In 1973, Rom Control Data, a peripheral equipment company, was founded in Bucharest as a joint venture with Control Data Corporation. Disk drives, tape transports, printers, and plotters were produced here for the domestic market and export until 1990.

The Institute of Informatics was set up in 1970 with the aim of centrally promoting the introduction of computers in the Romanian economy. Among the first managers of the institute were the following:

- Draganescu,
- Guran,
- Ioan Georgescu,[36]
- Ioan Romanu,[37]
- Buznea, and
- Nicolae Badea.[38]

The licensed products were soon followed by products resulting from their own research and development. In 1977, the first Romanian minicomputer was released (the Independent-100), which was PDP 11 compatible. This computer was soon followed by the I-101, I-102, and I-106 and the similar Coral systems. In the same period, operating systems for minicomputers were developed, and the Independent and Coral computers were launched into production.

Beginning in 1970, the Romanian computer industry was consolidated with manufacturing through a holding company (the Industrial Group for Electronics and Computer Technology) that also included the fields of electronic components, consumer electronics, and radio communications. The presidents of the group were Ioan Batrana,[39] Lazar Sandra,[40] and Baltac. The Romanian-made computers were exported to the People's Republic of China, Czechoslovakia, East Germany, and other countries in Eastern Europe, Africa, and the Middle East. At the end of 1989, more than 1,500 specialists were engaged in the domain of information technology (IT) research and development.

New Market-Oriented Approach

Since 1990, the transition to a market economy has significantly transformed the computer and IT scene. While notably restructured, the institutes for computers (ITC and Software–ITC) and informatics (ICI) continue to play a national role in promoting research and focusing field policy studies. The number of dynamic private companies (over 900 at present) mushroomed in various related areas, for example:

- trade,
- software development,
- system integration, and
- media.

All major IT companies are present now in Romania, including IBM, DEC, ICL, Hewlett-Packard, Sun Microsystems, Bull, Apple, Compaq, Microsoft, and Lotus. There are Internet and IT network providers: Both TRANSPAC and Sprint offer national-level services. Esprit, Phare, Copernicus, and TEMPUS programs of the European Union help the development of the research infrastructure. However, the general level of computerization is still considered unsatisfactory, with fewer than one PC per 20 employees and an average price of a PC that is 15 times the monthly net wage, prohibiting IT home use. Finally, economic difficulties keep investments in IT still at low levels.

Notes

[1] Passed away in the 1970s.
[2] Passed away in the 1970s.
[3] Retired, last position was head of laboratory in ITC.
[4] Retired, has lived in the United States since the 1970s.
[5] Retired, has lived in Israel since the 1980s.
[6] Now a Senior Research Fellow in ITC and Professor of management information systems in the National School for Political Studies and Public Administration.
[7] Passed away in the 1970s.
[8] Now a professor of informatics at the University of Cluj-Napoca.
[9] Now a professor, possibly at the University of Illinois in the United States.
[10] Now a Senior Research Fellow in Software–ITC Cluj-Napoca.
[11] Same as above.
[12] Retired, last position was head of laboratory in ITC.
[13] Passed away in the 1970s.
[14] Now Director General of Software–ITC.
[15] Retired as head of laboratory. Software–ITC.
[16] Now Senior Research Fellow at Software–ITC.
[17] Now Director General at the Institute for Automation.
[18] Passed away in the 1960s.
[19] Now Ambassador of Romania to Belgium, former president of the Romanian Academy.
[20] Passed away in the 1970s.
[21] Now a professor at the Polytechnical University of Timisoara.
[22] Now a professor in the United States.
[23] Passed away in the 1980s.
[24] Passed away in 1996.
[25] Passed away in the 1980s.
[26] Retired professor at the University of Bucharest.
[27] Professor at the Polytechnical University of Bucharest and the president of the National Informatics Commission of the government of Romania.
[28] Professor at the Polytechnical University of Bucharest.
[29] Professor at the Polytechnical University of Bucharest.
[30] Now living in France.
[31] Professor at the Polytechnical University of Bucharest.
[32] Professor at the Polytechnical University of Bucharest and a counselor to the president of Romania.
[33] Retired.
[34] Retired as an army general.
[35] Now a Senior Research Fellow in ITC and deputy director.
[36] Now in private computer business.
[37] Retired professor from the Academy of Economic Sciences in Bucharest.
[38] Now in private business, president of Computerland Romania.
[39] Now in private business.
[40] Retired.